

# Stanford

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## Sindy Tang

Assistant Professor of Mechanical Engineering

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### Bio

#### BIO

Research directions include microfluidics, optofluidics, nanophotonics, bioengineering.

#### ACADEMIC APPOINTMENTS

- Assistant Professor, Mechanical Engineering
- Member, Bio-X
- Faculty Fellow, Stanford ChEM-H

#### ADMINISTRATIVE APPOINTMENTS

- Assistant Professor, Mechanical Engineering, Stanford, (2011- present)

#### HONORS AND AWARDS

- Faculty Fellow Award, The Reid and Polly Anderson Foundation (2011-2013)
- Junior Faculty Fellow Award, Gabilan (2011-2013)
- Petroleum Fund New Investigator Award, ACS (2013-2015)
- 3M Nontenured Faculty Award, 3M (2013-2015)
- NSF CAREER Award, NSF (2015-2020)

#### PROFESSIONAL EDUCATION

- PhD, Harvard University , Engineering Sciences (2010)
- MS, Stanford University , Electrical Engineering (2004)
- BS, Caltech , Electrical Engineering (2003)

#### LINKS

- Tang Lab: <http://stanford.edu/group/tanglab/>

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### Teaching

#### COURSES

##### 2017-18

- Introduction to Micro and Nano Electromechanical Systems: ENGR 240 (Spr)
- Introductory Fluids Engineering: ME 70 (Win)

#### 2016-17

- Introduction to Micro and Nano Electromechanical Systems: ENGR 240 (Aut)
- Optofluidics: Interplay of Light and Fluids at the Micro and Nanoscale: ME 321 (Win)

#### 2015-16

- Introduction to Micro and Nano Electromechanical Systems: ENGR 240 (Aut)
- Introductory Fluids Engineering: ME 70 (Spr)
- Optofluidics: Interplay of Light and Fluids at the Micro and Nanoscale: ME 321 (Win)

#### 2014-15

- Introduction to Micro and Nano Electromechanical Systems: ENGR 240 (Win)
- Introductory Fluids Engineering: ME 70 (Spr)
- Optofluidics: Interplay of Light and Fluids at the Micro and Nanoscale: ME 321 (Aut)

### STANFORD ADVISEES

#### Doctoral Dissertation Advisor (AC)

Ya Gai

#### Master's Program Advisor

Danyang Fan

### Publications

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#### PUBLICATIONS

- **Self-repairing cells: How single cells heal membrane ruptures and restore lost structures** *Science*  
Tang, S. K., Marshall, W. F.  
2017; 356 (6342): 1022-1025
- **Microfluidic guillotine for single-cell wound repair studies.** *Proceedings of the National Academy of Sciences of the United States of America*  
Blauch, L. R., Gai, Y., Khor, J. W., Sood, P., Marshall, W. F., Tang, S. K.  
2017; 114 (28): 7283-88
- **Spatiotemporal periodicity of dislocation dynamics in a two-dimensional microfluidic crystal flowing in a tapered channel.** *Proceedings of the National Academy of Sciences of the United States of America*  
Gai, Y., Leong, C. M., Cai, W., Tang, S. K.  
2016; 113 (43): 12082-12087
- **Towards a droplet radiometric assay for single-cell analysis.** *Analytical chemistry*  
Gallina, M. E., Kim, T. J., Shelor, M., Vasquez, J., Mongersun, A., Kim, M., Tang, S. K., Abbyad, P., Pratz, G.  
2017
- **High-Efficiency and High-Throughput On-Chip Exchange of the Continuous Phase in Droplet Microfluidic Systems.** *SLAS technology*  
Kim, M., Leong, C. M., Pan, M., Blauch, L. R., Tang, S. K.  
2017: 2472630317692558-?
- **Amphiphilic nanoparticles suppress droplet break-up in a concentrated emulsion flowing through a narrow constriction.** *Biomicrofluidics*  
Gai, Y., Kim, M., Pan, M., Tang, S. K.  
2017; 11 (3): 034117
- **Methods to coalesce fluorinated Pickering emulsions** *Analytical Methods*  
Pan, M., Lyu, F., Tang, S. K.  
2017; 9: 4622-4629

- **Encapsulation of Single Nanoparticle in Fast-Evaporating Micro-droplets Prevents Particle Agglomeration in Nanocomposites** *ACS Applied Materials & Interfaces*  
Pan, M., Shi, X., Lyu, F., Levy-Wendt, B. L., Zheng, X., Tang, S. K.  
2017; 9 (31): 26602–26609
- **Time-varying droplet configuration determines break-up probability of drops within a concentrated emulsion** *Applied Physics Letters*  
Khor, J., Kim, M., Schütz, S. S., Schneider, T. M., Tang, S. K.  
2017; 111: 124102
- **Internal flow in droplets within a concentrated emulsion flowing in a microchannel** *PHYSICS OF FLUIDS*  
Leong, C. M., Gai, Y., Tang, S. K.  
2016; 28 (11)
- **Confinement and viscosity ratio effect on droplet break-up in a concentrated emulsion flowing through a narrow constriction.** *Lab on a chip*  
Gai, Y., Khor, J. W., Tang, S. K.  
2016; 16 (16): 3058-3064
- **Low energy emulsion-based fermentation enabling accelerated methane mass transfer and growth of poly(3-hydroxybutyrate)-accumulating methanotrophs.** *Bioresource technology*  
Myung, J., Kim, M., Pan, M., Criddle, C. S., Tang, S. K.  
2016; 207: 302-307
- **Surface-functionalizable amphiphilic nanoparticles for pickering emulsions with designer fluid-fluid interfaces** *RSC ADVANCES*  
Pan, M., Kim, M., Blauch, L., Tang, S. K.  
2016; 6 (46): 39926-39932
- **Fluorinated Pickering Emulsions with Nonadsorbing Interfaces for Droplet-based Enzymatic Assays** *ANALYTICAL CHEMISTRY*  
Pan, M., Lyu, F., Tang, S. K.  
2015; 87 (15): 7938-7943
- **Actuating Fluid-Fluid Interfaces for the Reconfiguration of Light** *IEEE JOURNAL OF SELECTED TOPICS IN QUANTUM ELECTRONICS*  
Pan, M., Kim, M., Kuiper, S., Tang, S. K.  
2015; 21 (4)
- **Quantitative detection of cells expressing BlaC using droplet-based microfluidics for use in the diagnosis of tuberculosis.** *Biomicrofluidics*  
Lyu, F., Xu, M., Cheng, Y., Xie, J., Rao, J., Tang, S. K.  
2015; 9 (4): 044120-?
- **Quantitative detection of cells expressing BlaC using droplet-based microfluidics for use in the diagnosis of tuberculosis** *BIOMICROFLUIDICS*  
Lyu, F., Xu, M., Cheng, Y., Xie, J., Rao, J., Tang, S. K.  
2015; 9 (4)
- **Optofluidic ultrahigh-throughput detection of fluorescent drops.** *Lab on a chip*  
Kim, M., Pan, M., Gai, Y., Pang, S., Han, C., Yang, C., Tang, S. K.  
2015; 15 (6): 1417-1423
- **Optofluidic ultrahigh-throughput detection of fluorescent drops.** *Lab on a chip*  
Kim, M., Pan, M., Gai, Y., Pang, S., Han, C., Yang, C., Tang, S. K.  
2015; 15 (6): 1417-1423
- **Fluorinated Pickering Emulsions Impede Interfacial Transport and Form Rigid Interface for the Growth of Anchorage-Dependent Cells** *ACS APPLIED MATERIALS & INTERFACES*  
Pan, M., Rosenfeld, L., Kim, M., Xu, M., Lin, E., Derda, R., Tang, S. K.  
2014; 6 (23): 21446-21453
- **Time capsule: an autonomous sensor and recorder based on diffusion-reaction.** *Lab on a chip*  
Gerber, L. C., Rosenfeld, L., Chen, Y., Tang, S. K.  
2014; 14 (22): 4324-4328
- **Review and analysis of performance metrics of droplet microfluidics systems** *MICROFLUIDICS AND NANOFUIDICS*

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- Rosenfeld, L., Lin, T., Derda, R., Tang, S. K.  
2014; 16 (5): 921-939
- **Prospective identification of parasitic sequences in phage display screens.** *Nucleic acids research*  
Matochko, W. L., Cory Li, S., Tang, S. K., Derda, R.  
2014; 42 (3): 1784-1798
  - **Break-up of droplets in a concentrated emulsion flowing through a narrow constriction** *Soft Matter*  
Rosenfeld, L., Fan, L., Chen, Y., Swoboda, R., Tang, Sindy, K.Y.  
2014; 10: 421-430
  - **Time capsule: an autonomous sensor and recorder based on diffusion-reaction** *LAB ON A CHIP*  
Gerber, L. C., Rosenfeld, L., Chen, Y., Tang, S. K.  
2014; 14 (22): 4324-4328
  - **Break-up of droplets in a concentrated emulsion flowing through a narrow constriction** *SOFT MATTER*  
Rosenfeld, L., Fan, L., Chen, Y., Swoboda, R., Tang, S. K.  
2014; 10 (3): 421-430
  - **Filter-based assay for Escherichia coli in aqueous samples using bacteriophage-based amplification.** *Analytical chemistry*  
Derda, R., Lockett, M. R., Tang, S. K., Fuller, R. C., Maxwell, E. J., Breiten, B., Cuddemi, C. A., Ozdogan, A., Whitesides, G. M.  
2013; 85 (15): 7213-7220
  - **Prospective identification of parasitic sequences in phage-display screens** *Nucleic Acids Research*  
Matochko, W., Li, C., Tang, Sindy, K.Y., Derda, R.  
2013
  - **Single particle detection in CMOS compatible photonic crystal nanobeam cavities** *Optics Express*  
Quan, Q., Floyd, Daniel, L., Burgess, Ian, B., Deotare, Parag, B., Frank, Ian, W., Tang, Sindy, K.Y.  
2013; 21: 32225-32233
  - **Uniform amplification of phage display libraries in monodisperse emulsions** *METHODS*  
Matochko, W. L., Ng, S., Jafari, M. R., Romaniuk, J., Tang, S. K., Derda, R.  
2012; 58 (1): 18-27
  - **Characterization of sensitivity and specificity in leaky droplet-based assays** *LAB ON A CHIP*  
Chen, Y., Gani, A. W., Tang, S. K.  
2012; 12 (23): 5093-5103
  - **High-Q, Low Index-Contrast Polymeric Photonic Crystal Nanobeam Cavities** *Conference on Lasers and Electro-Optics (CLEO)*  
Quan, Q., Burgess, I. B., Tang, S. K., Floyd, D. L., Loncar, M.  
IEEE.2012
  - **High-Q, low index-contrast polymeric photonic crystal nanobeam cavities** *OPTICS EXPRESS*  
Quan, Q., Burgess, I. B., Tang, S. K., Floyd, D. L., Loncar, M.  
2011; 19 (22): 22191-22197
  - **Bioinspired self-repairing slippery surfaces with pressure-stable omniphobicity** *NATURE*  
Wong, T., Kang, S. H., Tang, S. K., Smythe, E. J., Hatton, B. D., Grinthal, A., Aizenberg, J.  
2011; 477 (7365): 443-447
  - **Denaturation of Proteins by SDS and Tetraalkylammonium Dodecyl Sulfates** *LANGMUIR*  
Lee, A., Tang, S. K., Mace, C. R., Whitesides, G. M.  
2011; 27 (18): 11560-11574
  - **Reconfigurable Self-Assembly of Mesoscale Optical Components at a Liquid-Liquid Interface** *ADVANCED MATERIALS*  
Tang, S. K., Derda, R., Mazzeo, A. D., Whitesides, G. M.  
2011; 23 (21): 2413-?
  - **Multizone Paper Platform for 3D Cell Cultures** *PLOS ONE*  
Derda, R., Tang, S. K., Laromaine, A., Mosadegh, B., Hong, E., Mwangi, M., Mammoto, A., Ingber, D. E., Whitesides, G. M.

2011; 6 (5)

- **Externally Applied Electric Fields up to  $1.6 \times 10^5$  V/m Do Not Affect the Homogeneous Nucleation of Ice in Supercooled Water** *JOURNAL OF PHYSICAL CHEMISTRY B*  
Stan, C. A., Tang, S. K., Bishop, K. J., Whitesides, G. M.  
2011; 115 (5): 1089-1097
- **Diversity of Phage-Displayed Libraries of Peptides during Panning and Amplification** *MOLECULES*  
Derda, R., Tang, S. K., Li, S. C., Ng, S., Matochko, W., Jafari, M. R.  
2011; 16 (2): 1776-1803
- **Continuously tunable microdroplet-laser in a microfluidic channel** *OPTICS EXPRESS*  
Tang, S. K., Derda, R., Quan, Q., Loncar, M., Whitesides, G. M.  
2011; 19 (3): 2204-2215
- **Cytoplasmic self-organization of internal membranes, microtubule- and actin-cytoskeleton inside microfluidics generated droplets** *Annual Meeting of the American-Society-for-Cell-Biology (ASCB)*  
Tang, S., Renz, M., Driscoll, M., REBER, S., Nguyen, A., Daniels, B., Field, C., Lippincott-Schwartz, J.  
AMER SOC CELL BIOLOGY.2011
- **Slippery surfaces with omniphobicity, self-repair, high-pressure stability and optical transparency** *Nature*  
Wong, T., Kang, S. H., Tang, Sindy, K.Y., Smythe, E., Hatton, B., Grinthal, A.  
2011; 447: 443
- **Monte Carlo simulation of centrosomal self-centering due to pushing by microtubules in large cells.** *Annual Meeting of the American-Society-for-Cell-Biology (ASCB)*  
Tang, S. K., Castle, B. T., Odde, D. J.  
AMER SOC CELL BIOLOGY.2011
- **Cofabrication: A Strategy for Building Multicomponent Microsystems** *ACCOUNTS OF CHEMICAL RESEARCH*  
Siegel, A. C., Tang, S. K., Nijhuis, C. A., Hashimoto, M., Phillips, S. T., Dickey, M. D., Whitesides, G. M.  
2010; 43 (4): 518-528
- **Uniform Amplification of Phage with Different Growth Characteristics in Individual Compartments Consisting of Monodisperse Droplets** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*  
Derda, R., Tang, S. K., Whitesides, G. M.  
2010; 49 (31): 5301-5304
- **Paper-supported 3D cell culture for tissue-based bioassays** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Derda, R., Laromaine, A., Mammoto, A., Tang, S. K., Mammoto, T., Ingber, D. E., Whitesides, G. M.  
2009; 106 (44): 18457-18462
- **Independent Control of Drop Size and Velocity in Microfluidic Flow-Focusing Generators Using Variable Temperature and Flow Rate** *ANALYTICAL CHEMISTRY*  
Stan, C. A., Tang, S. K., Whitesides, G. M.  
2009; 81 (6): 2399-2402
- **A multi-color fast-switching microfluidic droplet dye laser** *LAB ON A CHIP*  
Tang, S. K., Li, Z., Abate, A. R., Agresti, J. J., Weitz, D. A., Psaltis, D., Whitesides, G. M.  
2009; 9 (19): 2767-2771
- **Basic Microfluidic and Soft Lithographic Techniques** *Optofluidics: Fundamentals, Devices, and Applications*  
Tang, Sindy, K.Y., Whitesides, George, M.  
McGraw-Hill.2009
- **Optical Components Based on Dynamic Liquid-liquid Interfaces** *Optofluidics: Fundamentals, Devices, and Applications*  
Tang, Sindy, K.Y., Whitesides, George, M.  
McGraw-Hill.2009
- **Dynamically reconfigurable liquid-core liquid-cladding lens in a microfluidic channel** *LAB ON A CHIP*

Tang, S. K., Stan, C. A., Whitesides, G. M.

2008; 8 (3): 395-401

- **Optical waveguiding using thermal gradients across homogeneous liquids in microfluidic channels** *APPLIED PHYSICS LETTERS*

Tang, S. K., Mayers, B. T., Vezenov, D. V., Whitesides, G. M.

2006; 88 (6)

- **Optical waveguiding using thermal gradients across homogeneous liquids in microfluidic channels** *Applied Physics Letters*

Tang, Sindy, K.Y., Mayers, Brian, T., Vezenov, Dmitri, V., Whitesides, George, M.

2006; 6 (88): 061112